

# AI-enabled Preventive Grid Analytics



Fault Detection  
& Location



Preventive  
Analysis



Improved Grid  
Reliability and Safety



InHand Networks

# IWOS: Line Sensor + Concentrator + AI Analytics Platform

## System Components

### Line Sensor

- + Compatible with **50Hz/60Hz** grids
- + High precision current measurement: **0~630A, ±0.5%**
- + High sampling rate of oscillography waveforms: **12.8KHz** (256 samples/cycle)
- + Zero-sequence current synthesis enabled by **20µs** precision sync
- + Power optimization operation
  - Full-function mode: all functions including waveform recording enabled; powered by line and supercapacitor
  - Low-power mode: waveform recording disabled; powered by line and battery
- + Power harvesting: **1A** to support full-function mode; supercapacitor backs for 12h
- + IP67, water proof
- + Light weight: <1.5kg, live installation and removal

### Concentrator

- + WAN: **LTE/AMI/LoRa**
- + Field Area Network: RF
- + High-Precision (1µs) GPS for location and time synchronization
- + Fault detection based on zero-sequence current synthesis
- + Main and backup power: solar, maintenance-free capacitor
- + IP55 protection
- + Remote upgrade & maintenance

### AI Analytics Platform

- + Sensor and concentrator management
- + GIS-based real-time monitoring of line status and events
- + Deep learning analytic system
  - Oscillography waveform classification powered by **AI algorithms**
  - Accurate fault location and SMS alarms
  - **Preventive analysis** and early warning
- + **Flow Direction & Load Analysis**
- + Reports
  - Load trend & statistics
  - Power quality analysis
  - Fault statistics

## World's #1 Deployment

Line Sensors Deployed

**120,000+**

Power Lines Covered

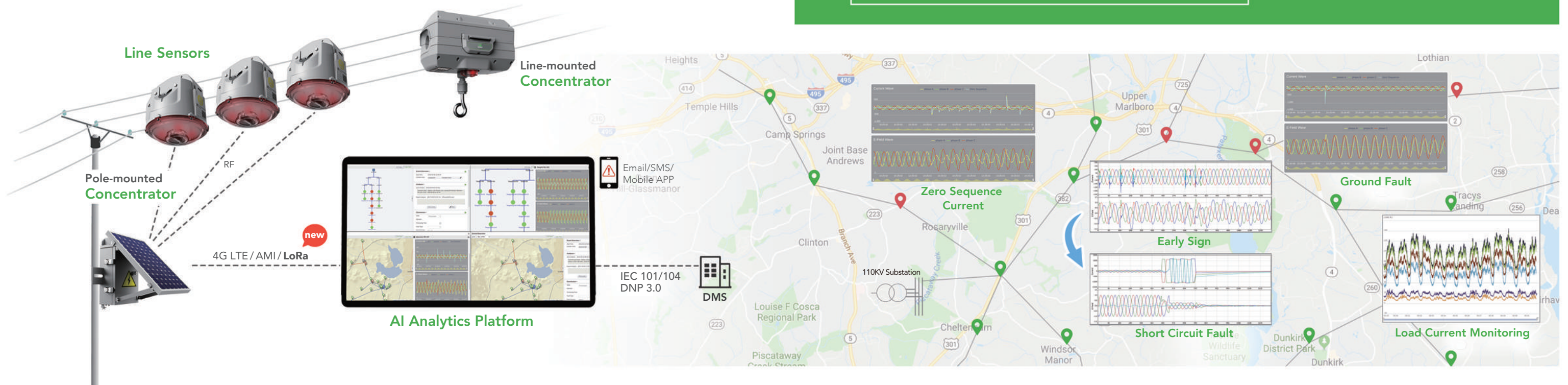
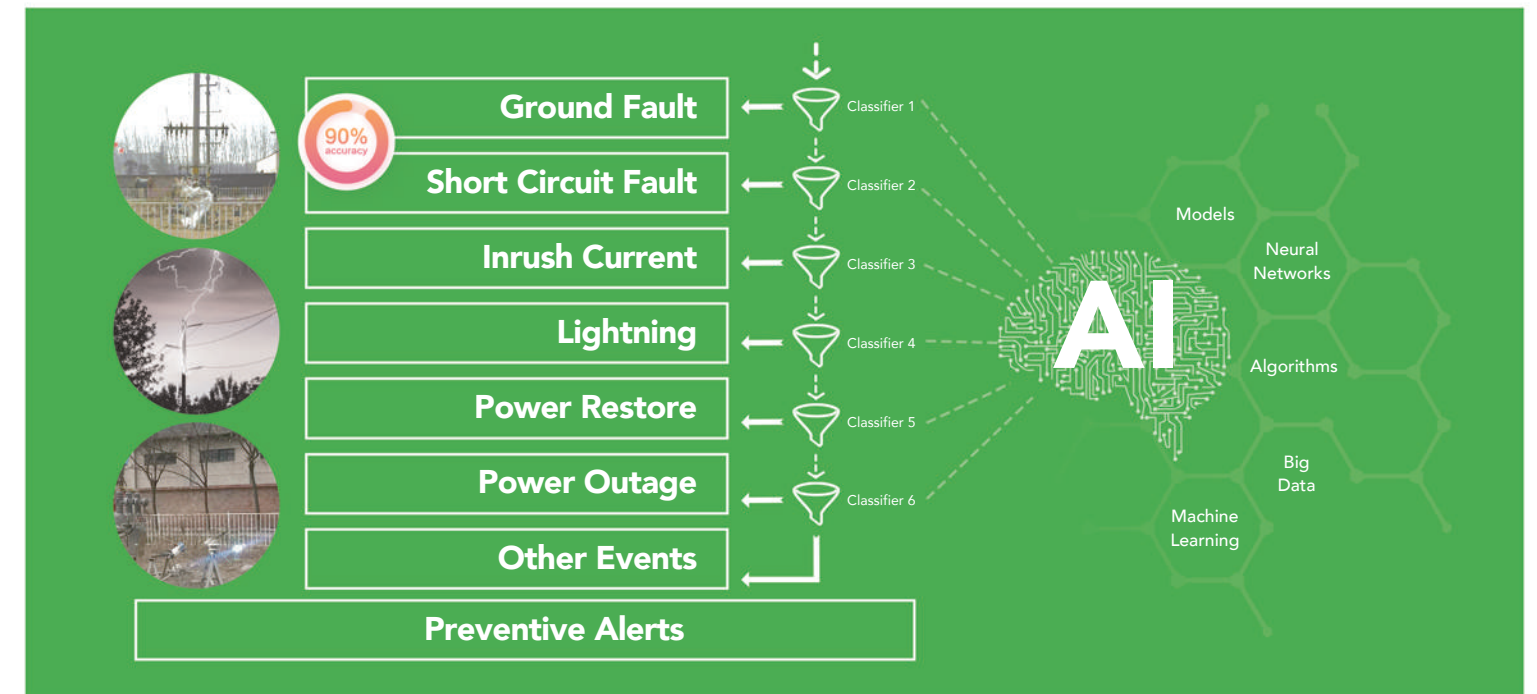
**11,000+**

Power Line Events & Waveform Data

**28 Million+**

Line Faults Detected

**35,000+**



# Model Nomenclature

## IWOS Line Sensor



Overhead Line Sensor Model	Model code: IWO-C-<C/U/M/S><5/6><A/L>				Remarks
	<C/U/M/S>: Short-range Frequency	<5/6>: Line Frequency	<A/L>: Version		
IWO-C-<C/U/M/S><5/6><A/L>	C: 470-510MHz U: 915-928MHz M: 866MHz S: 919-923MHz	China, Thailand North America, New Zealand Middle East Malaysia	5: 50Hz 6: 60Hz	A: AI L: LT	When the Concentrator needs to support 3 groups of line sensors: Phase-A: IWO-C1/C4/C7-<C/U/M/S><5/6><A/L> Phase-B: IWO-C2/C5/C8-<C/U/M/S><5/6><A/L> Phase-C: IWO-C3/C6/C9-<C/U/M/S><5/6><A/L>
Example:	IWO-C-U6A: overhead line sensor, short-range communication frequency is 470-510MHz, applicable to 60Hz 10KV power lines of North America and New Zealand.				

## IWOS Concentrator - Pole-mounted / Line-mounted



Concentrator Model	Model code: IWO-HD/HX-<WMNN>-<C/U/M/S><5/6><A/B/C/D/E/F><2/3/N>					
	HD/HX: Concentrator Type	<WMNN>: Cellular Type & Module	<C/U/M/S>: Short-range Frequency	<5/6>: Line Frequency	<A/B/C/D/E/F>: Battery	<2/3/N>: Solar Power
IWO-HD/HX-<TL00>-<C/U/M/S><5/6><A/B/C/D/E/F><2/3/N>	HD: Pole-mounted HX: Line-mounted	China - LTE CAT4: LTE-FDD Band1/3/5/8 LTE-TDD Band38/39/40/41 TD-SCDMA Band34/39 UMTS(DC-HSPA+) Band 1/5 EDGE/GPRS/GSM 850/900/1800/1900MHz	C: 470-510MHz China, Thailand		A: 7.2Ah Lead-acid	
IWO-HD/HX-<FH20>-<C/U/M/S><5/6><A/B/C/D/E/F><2/3/N>	HD: Pole-mounted HX: Line-mounted	Europe, Asia Pacific - LTE CAT4: LTE-FDD Band 1/2/3/4/5/7/8/20 UMTS(DC-HSPA+) Band1/2/5/8 EDGE/GPRS/GSM 850/900/1800/1900MHz	U: 915-928MHz North America, New Zealand	5: 50Hz	B: 12Ah Lead-acid	2: 20W
IWO-HD/HX-<FB53>-<C/U/M/S><5/6><A/B/C/D/E/F><2/3/N>	HD: Pole-mounted HX: Line-mounted	Europe - LTE CAT1: LTE-FDD Band 3/7/20 EDGE/GPRS/GSM 900/1800/MHz	M: 866MHz Middle East	6: 60Hz	C: 40Ah Li-phosphate	3: 30W
IWO-HD/HX-<FB78>-<C/U/M/S><5/6><A/B/C/D/E/F><2/3/N>	HD: Pole-mounted HX: Line-mounted	Australia, South America - LTE CAT4: LTE-FDD CAT4 Band 1/3/5/7/8/28 UMTS(DC-HSPA+) 850/900/1900/2100	S: 919-923MHz Malaysia		D: 40Ah Gel	N: No solar power
IWO-HD/HX-<FB13>-<C/U/M/S><5/6><A/B/C/D/E/F><2/3/N>	HD: Pole-mounted HX: Line-mounted	North America, AT&T, T-Mobile - LTE CAT1: LTE-FDD Band2/4/12			E: 12Ah Li-phosphate	
IWO-HD/HX-<FB02>-<C/U/M/S><5/6><A/B/C/D/E/F><2/3/N>	HD: Pole-mounted HX: Line-mounted	Global, North America AT&T, Verizon Wireless: LTE CAT-M & NB1			F: 3.3Ah Li-phosphate	
Example:	IWO-HD-FH20-C5B2: Concentrator, pole-mounted, supports Europe and Asia Pacific networks, short-range communication frequency is 470-510MHz, applicable to 50Hz 10KV power lines, packaged with 12Ah lead-acid battery, 20W solar panel.					

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